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ABSTRACT

Designed for students in grades 7 through 10, this teaching unit presents illustrative resource materials depicting the multi-factor nature of a geographic region. The unit focuses not only on climatic factors, but also on introducing other regional factors in an informal way. A blackboard summary of a class discussion of the different regions is presented. The aim of the unit is for students to understand that: (1) regions can be virtually any size; (2) as the number of factors considered increases, the region must become smaller; (3) multi-factor regions can often be designated by more than one name; (4) the study of geography must consider human influences; (5) different regions interact with one another, principally through the agency of human beings; (6) a region cannot be controlled or managed without boundaries; and (7) political regions that also happen to be natural and geographical regions tend to be more stable or unified than political regions that do not make geographic sense. Seven student questions require students to compare geographic regions on a map of Africa and to record their understanding by completing charts and cross-sections. An answer key and notes are provided, together with illustrations, charts, and graphs. (LH)

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Horizon

Discovering the Multi-Factor Region

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Context

This article is a successor to an earlier one entitled *A Discovery Approach to Climatic Concepts and Regions*, which appeared in *Horizon*, Vol. 20, No. 1 (Fall 1981). Students working through the exercises given in that article will have acquired an analytic and synthetic understanding of climatic elements and factors, not seen as isolated, disjointed entities, but as a dynamic interplay of forces having a very definite impact on the earth's surface. Areas of the earth's surface having a similar climatic environment were then to be designated as *climatic regions*. A *region* was understood to be an area of the earth's surface that was more or less uniform in some respect, to distinguish it from surrounding areas. Africa was selected as the observation theatre for demonstrating climatic patterns. It was chosen because its symmetry about the equator rendered its patterns easier to contend with than those of any other continent. Students had been required not only to identify climatic regions on a map of Africa, but to record their understanding by completing charts and cross-sections.

Introducing Other Regional Factors in an Informal Way

Climate is, for reasons previously indicated, the most important of the natural environmental factors because it is the principal determinant of the other *natural* factors such as vegetation, soil, and fauna. Many students, however, do not perceive the world in terms of wet, hot, or cold zones. Many of them, especially students from Grades 7 to 10, see distant lands in terms of jungles, mountainscapes, exotic animals, or unusual human activities such as igloo-building or reindeer-herding.

In other words, students already intuitively know that a region may have *more than one* distinguishing characteristic. Accordingly, teachers may find it convenient to promote a class discussion of the different regions, inviting students to suggest names for them, to provide examples of them, and so forth. A blackboard summary of such a discussion might appear as follows:

KINDS OF REGIONS

Type of region	Characteristics	Examples
Single-factor region	Uniform in only one respect.	*Canada* is a *political* region and is uniform only in respect of being governed by Ottawa.
Multi-factor region	Tends to be uniform in two or more respects.	Amazon basin is distinctive in climate, vegetation, soils, and low population density.
Natural region	Multi-factor region in which the regional characteristics are determined by nature.	Sahara desert has a general absence of rain, vegetation, and wildlife.
Cultural region	Multi-factor region principally based on human-made factors.	Chinatown, Vancouver has a distinct ethnic, commercial, urban flavor.
Geographic region	Multi-factor region determined by both natural and human-made factors.	Lower Mainland, B.C.: an urban way of life emphasizing trade is based on a coastal delta, having distinctive topography, coastal configuration, climate, and agricultural possibilities.

Under skilful cross-examination by the teacher, students can be led to realize that:

- Regions can be virtually any size, from the one square mile of the Vatican to the area of a continent—or indeed the world.
- As the number of factors considered increases, the smaller the region must become. The fewer the factors considered, the greater is the probability that they may operate over a large area.
- Multi-factor regions can often be designated by more than one name.
- Large single-factor regions can usually be broken into smaller multi-factor regions.
- Humans must be in the picture before one can speak of a *geographical region*. In other words, geography, to be complete, must be *people-focussed*.
- Different regions interact with one another, principally through the agency of human beings—by way of trade, travel, migration, war, and so forth.
- A region cannot be controlled or managed unless a boundary can be drawn around it that will prevent conflict with other regions. Natural boundaries (such as mountains, for example) are better for that purpose than an artificial boundary such as that separating Poland from Russia. Even in Canada, some provinces and the federal government cannot agree as to whose boundary extends over certain natural resources.
- Political regions that also happen to be natural and geographical regions tend to be more stable or unified than political regions that do not make geographical sense.

A useful mini-exercise at this point might be to ask students to divide Canada and/or North America into natural regions and to compare the results with the existing provincial divisions. This could provide some interesting insights.

Systematizing Student Understanding of Natural Regions

A map showing the *climatic* regions of Africa was provided in the previous article. This map can be readily compared with the *vegetation* map of Africa that is found in all standard school atlases. Students will immediately detect an approximate areal coincidence between the climatic regions and these vegetation regions. Such map comparison is really an exercise in *visual correlation*. Such visual correlation can be extended to include the *soils* map of Africa. The soils map can be found in the early versions of the *Canadian Oxford School Atlas* (COSA) and in some textbooks. As none of the late edition atlases include this map (for reasons of space limitation), a clear-cut soils map employing the most useful generic terms is given in Figure 7 below.

The assignments provided below will be self-explanatory. An answer key with notes is given as well.

ASSIGNMENT

(Continued from *Horizon*, Vol. 20, No. 1, page 12)

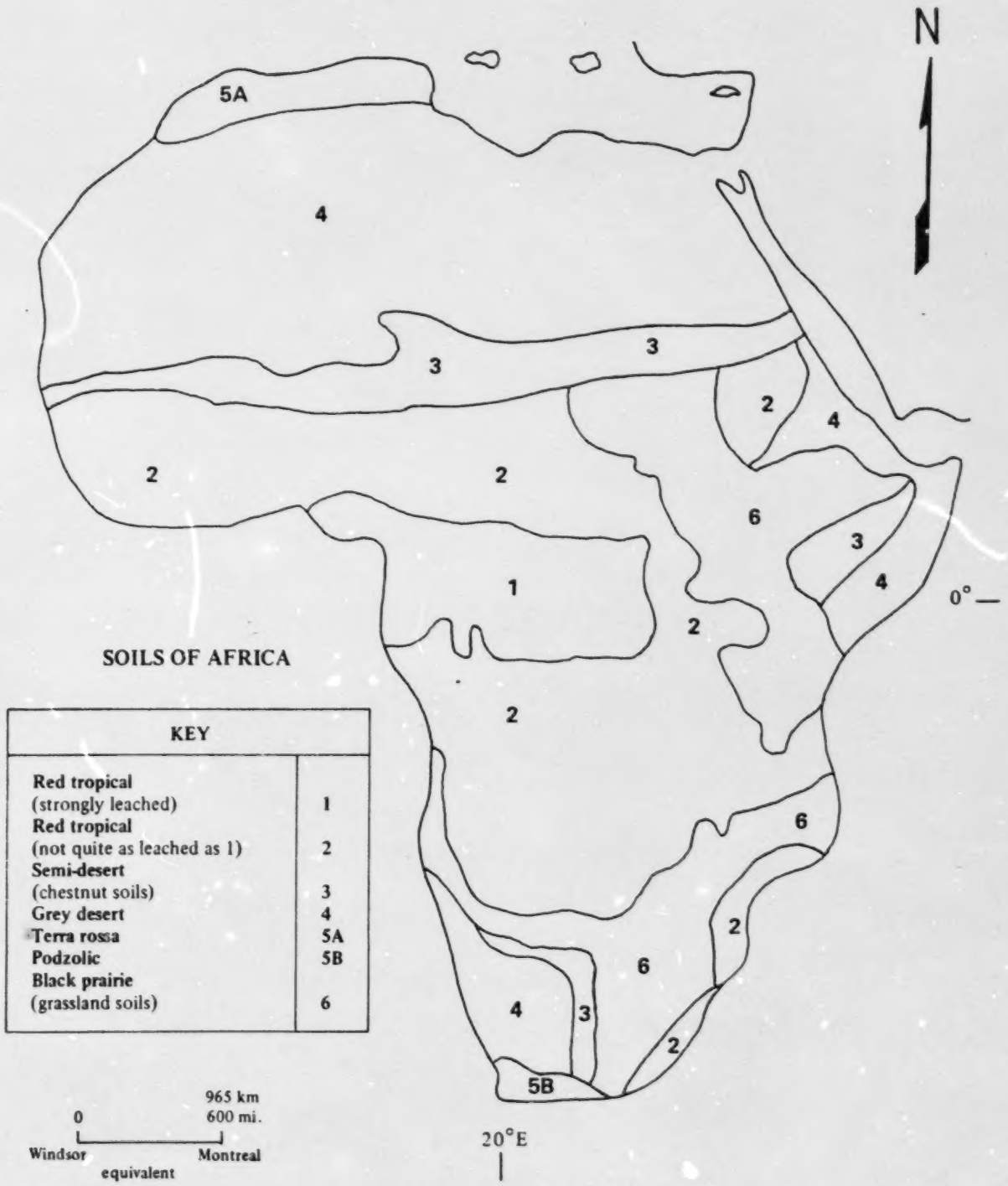
Vegetation and Soils

18. Visually compare the climate, vegetation, and soil maps of Africa (or any other region of interest to teacher and students) that are provided in your handouts and/or atlas; then complete the table below. In comparing climate, vegetation, and soil regions, consider the *core-areas* and do not worry if the boundaries do not fit one another exactly.

FIGURE C

Climatic type	Vegetation type	Vegetation description	Soil Type	Soil Description
Hot-wet tropics	Selva	Three-tiered broadleaf evergreen forest; N.B. for hardwoods, for example, teak, ebony	Red tropical	Strongly leached; red because iron and aluminum in soil do not dissolve, but remain to give a "rusty" color.
Wet-dry tropics Semi-desert Tropical drylands Mediterranean Damp subtropics Warm temperate Tropical highland	To be treated as above. Climate-type names are the same as those given in Figure A.			

FIGURE 7


N
5A
4
3
3
2
4
2
2
6
3
4
1
2
0°
2
6
2
4
3
2
5B
20°E
SOILS OF AFRICA
KEY
Red tropical (strongly leached) 1
Red tropical (not quite as leached as 1) 2
Semi-desert (chestnut soils) 3
Grey desert 4
Terra rossa 5A
Podzolic 5B
Black prairie (grassland soils) 6
0
965 km
600 mi.
Windsor
Montreal
equivalent

NATURAL REGIONS–AFRICA

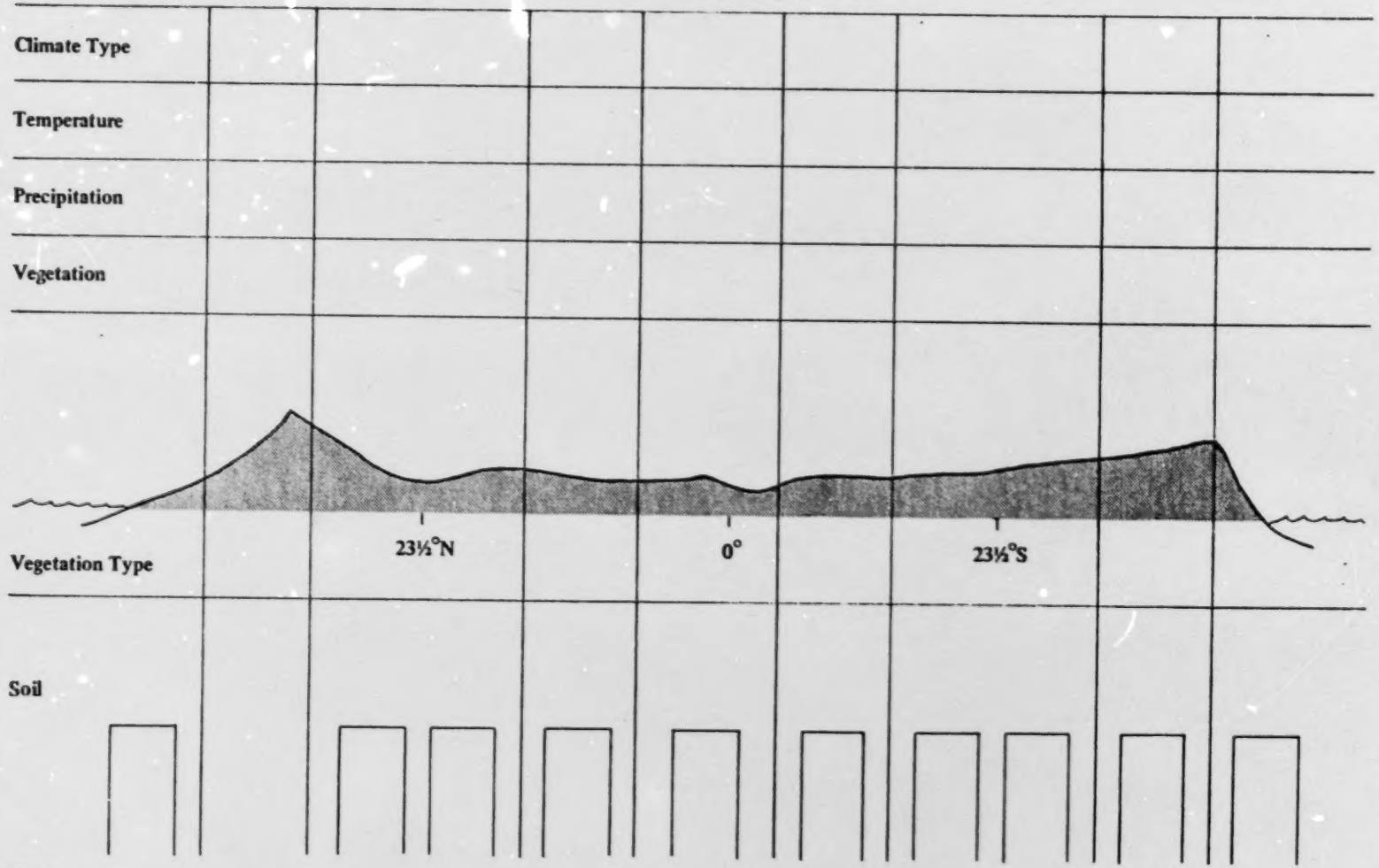


FIGURE 8

19. a. *Summarize* what you have learned about the relationships between climate, vegetation, and soils in a *diagram*. Use the diagram format provided.
(The teacher may then provide Figure 8 as a handout, or use it as an overhead transparency; or rough out a similar blackboard sketch. The transparency or blackboard versions permit the use of appropriate colors for landforms and vegetation.)
    b. Translate your summary diagram into words. An organized half-page will suffice.
    c. Suggest the "so what?" of these "areal associations," in your diagram, for the people living there.
    d. Suggest a title for the table that you have just completed.

20. Why does vegetation type change with changes in climate?

21. a. What is soil? Of what two basic components is it composed?
    b. How and why does soil reflect vegetation and climate?

Regions

22. What is a region?

23. a. What are the different kinds of regions and what are they called?
    b. Give examples of each kind.

24. Of what use to us is knowledge of the characteristics of various regions?

ANSWER KEY AND NOTES

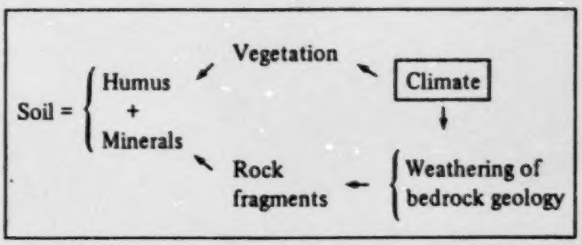
Vegetation and Soils

18. Figure C (answer) below is one completed version of the table required by this question. This particular table represents a synthesis of class investigation and discussion. An additional column giving the Köppen designation for each climate type was included for senior classes (Grades 11 and 12). It can be omitted for junior classes.

19. a. A representative summary diagram for the climate, vegetation, and soils of Africa is given below in Figure 8 (answer). The use of blackboard or overhead transparency would permit a display of the appropriate colors to make the natural regions, which have been pieced together, stand out. The Köppen letters for each climate type have been included, but they can be deleted for junior classes.
    b. The student's verbal translation would simply suggest what the relationships are and why.
    c. This is a *very important question* to assist students in grasping the point of the whole exercise. Essentially, each natural region is a *distinct habitat affording distinctive possibilities for the life of humans*. Consequently, different responses to differing environmental possibilities are inevitable. Since a response expresses a way of life or *culture*, the teacher now has a springboard for future discussions of *cultural regions*. At the same time, an important values-education issue arises as students will inevitably realize that their own North American subculture is not an absolute value but simply a particular set of responses to a particular environment.
    d. Asking for a title is an additional device for getting students to generalize. In this case, the actual title is not as important as the discussions that will be stimulated by the effort of creating it.

20. About 85% or more of the biomass of vegetation is made up of water. Hence, the lushest vegetation—that of the rainforest—requires copious precipitation, and so forth. Temperature is also important. Plant seeds will not generally germinate if temperatures are below 43°F. One or more months that have a temperature of 50°F or more are a precondition for tree growth which also requires at least 20"-25" of precipitation in temperate climates. A full-blown biology unit is uncalled for if one's focus is that of conceptualizing regions. However, if students know some basic biogeographic facts, which can be imparted in half a period, the criteria for demarcating physical-factor regions will not appear as arbitrary rote-knowledge. Rather, students will be able to *reason* their way through relationships from first principles.

21. The reason for this question follows from the notes just given for question 20 above.



From the sketch, it is evident that climate is the ultimate determinant of soil type.

Soil is a habitat-component that in turn determines some agricultural possibilities.

Students might be given the following basic facts:

- The best soils have a balance of humus and minerals; for example, the black earths or chernozems of the prairies.
- Where there is enough rain for trees, leaching will occur.
- Leaching tends to remove lime from the upper soil horizons.
- Low rainfall therefore results in high-lime but low-humus soils. Such soils are very fertile under irrigation.
- Hot wet climates produce the most vegetation and therefore the most humus, but the most leaching is also present so that humus disappears as quickly as it is produced.
- Although chernozems are among the best soils in the world, rainfall may not be as reliable for crops as it is in the slightly leached soil zones.
- Leafy deciduous trees produce more humus than the needles of coniferous trees, which also tend to inhibit earthworm activity.

Regions

The answers to these questions have been given in the introductory sections of this article.

FIGURE C (ANSWER)

Climate, Vegetation and Soils (in areal association)

Climate type	Köppen*	Vegetation type	Vegetation description	Soil type	Soil description
Hot-wet tropics	Af	Selva	Three-tiered broadleaf evergreen forest; N.B. for hardwoods—teak, ebony, rosewood, mahogany	Red tropical	Strongly leached; red because iron and aluminum in soil do not dissolve, but remain to give a "rusty" color.
Wet-dry tropics	Aw	Savannah	Tall coarse grass and thorn forest	Red tropical	As above, but not quite as strongly leached because of less rain
Semi-desert	BSh	Steppe	Scrubby short grass in clumps, separated by much open space	Chestnut	Not enough humus to make soil black, high in minerals, very productive under irrigation
Tropical drylands	BWh	Almost none	Some xerophytic scrub cactuslike	Grey desert (sierozem)	All mineral and no humus
Mediterranean	Csa	Mediterranean woodland	Xerophytic (drought-resistant)—olives, citrus, cork oak	Terra rossa (pink earth)	Some leaching during winter rains—"rustiness." Summer drought—upward movement of white lime salts. Red + white = pink
Damp subtropics	Cfa	Jungle	Dense low growth, except where cleared; can grow bananas, pine-apples, and sugar cane	Red tropical	See red tropical above
Warm temperate	Cwa	Temperate grassland	Similar to prairie grass	Black prairie (chernozem family)	Ranks with best soils in Africa, best balance between humus and minerals
Highland	H	Variable, depending upon latitude, elevation, slope, and aspect.			

**For senior classes or for enrichment with accelerated intermediate classes.*

AFRICA–NATURAL REGIONS: RELATIONSHIPS–CLIMATE, VEGETATION AND SOILS

A	Mediterranean	Tropical drylands		Wet-dry tropics	Hot-wet tropics	Wet-dry tropics	Tropical drylands		Warm temperate	Cool Mediterranean
B	Csa	BWh	BSh	Aw	Af	Aw	BSh	BWh	Cwa	Csb
C	All months 40°F (5°C)	All months 50°F (10°C)		All months 70°F (20°C)	All months 70°F (20°C)			All months 50°F (10°C)	All months 40°F (5°C)	
D	25-30" (60-75 mm)	10" (25 mm)	15-25" (35-60 mm)	35-60" (90-150 mm)	60-80"+ (150-200 mm)				25-35" (60-90 mm)	25-30" (60-75 mm)

E	Mediterranean woodland	Desert	Steppe	Savannah	Selva	Savannah	Steppe	Desert	Grassland	Warm temperate forest

A	Climatic Region	C	Temperature	E	Natural Region
B	Koppen Climatic Type	D	Precipitation	F	Soil Type

FIGURE 8 (ANSWER)